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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,070	12/09/2003	Paul F. Reboa	200210084-1	3738

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EXAMINER

THOMPSON, TIMOTHY J

ART UNIT PAPER NUMBER

2873

DATE MAILED: 05/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/731,070

Applicant(s)

REBOA ET AL.

Examiner

Timothy J Thompson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 12-22, 27-35, 38-46, 50 and 51 is/are rejected.
- 7) ☒ Claim(s) 8-11, 23-26, 36, 37, 47-49 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/2003.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 12-22, 27-35, 38-46, 50, 51 are rejected under 35 U.S.C. 102(B) as being anticipated by Sakata(U.S. Pat. 4,729,640).

Regarding claim 1, Sakata discloses a substrate(fig 9, 3); a transparent plate spaced from the substrate(fig 9, 3), the transparent plate and the substrate defining a cavity there between(fig 9, 2); at least one electrode formed on the substrate adjacent the cavity(fig 9, 4); and a liquid having an index of refraction greater than one disposed within the cavity(fig 15), wherein an interface of the liquid is oriented at an angle to a surface of the at least one electrode and oriented at an angle to a surface of the transparent plate(fig 9, col 4, lines 32-68), wherein light is adapted to pass through and refract at the interface of the liquid(the light will inherently refract at the interface of the substrate and the liquid since as shown by fig 15, the liquid and the substrate have different index of refraction).

Regarding claim 2, Sakata discloses the surface of the at least one electrode is substantially planar over an entirety thereof(fig 9, 4).

Regarding claim 3, Sakata discloses the surface of the at least one electrode is oriented substantially parallel with the surface of the transparent plate(fig 9, 4).

Regarding claim 4, Sakata discloses the index of refraction of the liquid is adapted to change when an electrical signal is applied to the at least one electrode(col 16, lines 29-40).

Regarding claim 5, Sakata discloses the transparent plate has an uneven surface including a plurality of recessed areas, wherein the interface of the liquid is provided along the uneven surface within the recessed areas(fig 9, 2, 3).

Regarding claim 6, Sakata discloses the at least one electrode is associated with one of the recessed areas of the uneven surface(fig 9, 2, 3).

Regarding claim 7, Sakata discloses a transparent electrode formed within the transparent plate(fig 9, 4).

Regarding claim 12, Sakata discloses the surface of the at least one electrode is a reflective surface, wherein the reflective surface is adapted to reflect the light through the liquid, through the interface of the liquid, and through the surface of the transparent plate(col 12, lines 25-40).

Regarding claim 13, Sakata discloses the substrate is a transparent substrate and the at least one electrode is a transparent electrode, wherein the light is adapted to pass through the transparent electrode and the transparent

substrate(fig 9).

Regarding claim 14, Sakata discloses an display device including the light modulator(col 1, lines 6-13).

Regarding claim 15, Sakata discloses an optical switch including the light modulator(col 1, lines 35-37).

Regarding claim 16, Sakata discloses spacing a transparent plate from a substrate(fig 1B), including defining a cavity between the transparent plate and the substrate(fig 9, 2), forming at least one electrode on the substrate adjacent the cavity(fig 9, 4); and disposing a liquid having an index of refraction greater than one within the cavity(fig 15), including orienting an interface of the liquid at an angle to a surface of the at least one electrode and at an angle to a surface of the transparent plate(fig 9 and col 4, lines 32-68), wherein light is adapted to pass through and refract at the interface of the liquid(the light will inherently refract at the interface of the substrate and the liquid since as shown by fig 15, the liquid and the substrate have different index of refraction).

Regarding claim 17, Sakata discloses the surface of the at least one electrode is substantially planar over an entirety thereof(fig 9, 4).

Regarding claim 18, Sakata discloses forming the at least one electrode includes orienting the surface of the at least one electrode substantially parallel with the surface of the transparent plate(fig 9, 4).

Regarding claim 19, Sakata discloses the index of refraction of the liquid is adapted to change when an electrical signal is applied to the at least one

electrode(col 16, lines 29-40).

Regarding claim 20, Sakata discloses forming the transparent plate with an uneven surface including a plurality of recessed areas, wherein the interface of the liquid is provided along the uneven surface within the recessed areas(fig 9, 2, 3).

Regarding claim 21, Sakata discloses forming the at least one electrode includes associating the at least one electrode with one of the recessed areas of the uneven surface(fig 9, 2, 3).

Regarding claim 22, Sakata discloses forming a transparent electrode within the transparent plate(fig 9, 4).

Regarding claim 27, Sakata discloses forming the at least one electrode includes forming the surface of the at least one electrode as a reflective surface, wherein the reflective surface is adapted to reflect the light through the liquid, through the interface of the liquid, and through the surface of the transparent plate(col 12, lines 25-40).

Regarding claim 28, Sakata discloses the substrate is a transparent substrate, and wherein forming the at least one electrode includes forming the at least one electrode as a transparent electrode, wherein the light is adapted to pass through the transparent electrode and the transparent substrate(fig 9).

Regarding claim 29, Sakata discloses a substrate(fig 9, 3); a transparent plate spaced from the substrate(fig 9, 3), the transparent plate and the substrate defining a cavity there between(fig 9, 2); at least one electrode formed on the substrate adjacent the cavity(fig 9, 4); and a liquid having an index of refraction greater than one disposed

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within the cavity(fig 15), and means for orienting an interface of the liquid at an angle to a surface of the at least one electrode and at an angle to a surface of the transparent plate, wherein light is adapted to pass through and refract at the interface of the liquid(fig 9, col 4, lines 32-68), wherein light is adapted to pass through and refract at the interface of the liquid(the light will inherently refract at the interface of the substrate and the liquid since as shown by fig 15, the liquid and the substrate have different index of refraction).

Regarding claim 30, Sakata discloses the surface of the at least one electrode is substantially planar over an entirety thereof(fig 9, 4).

Regarding claim 31, Sakata discloses the surface of the at least one electrode is oriented substantially parallel with the surface of the transparent plate(fig 9, 4).

Regarding claim 32, Sakata discloses the index of refraction of the liquid is adapted to change when an electrical signal is applied to the at least one electrode(col 16, lines 29-40).

Regarding claim 33, Sakata discloses the transparent plate has an uneven surface including a plurality of recessed areas, wherein the interface of the liquid is provided along the uneven surface within the recessed areas(fig 9, 2, 3). wherein the at least one electrode is

Regarding claim 34, Sakata discloses associated with one of the recessed areas of the uneven surface(fig 9, 2, 4).

Regarding claim 35, Sakata discloses a transparent electrode formed within the transparent plate(fig 9, 4).

Regarding claim 38, Sakata discloses forming the at least one electrode includes forming the surface of the at least one electrode as a reflective surface, wherein the reflective surface is adapted to reflect the light through the liquid, through the interface of the liquid, and through the surface of the transparent plate(col 12, lines 25-40).

Regarding claim 39, Sakata discloses the substrate is a transparent substrate, and wherein forming the at least one electrode includes forming the at least one electrode as a transparent electrode, wherein the light is adapted to pass through the transparent electrode and the transparent substrate(fig 9).

Regarding claim 40, Sakata discloses method of controlling light with a light modulator including at least one electrode(fig 9, 4) formed on a substrate(fig 9, 3); the method being: directing light through a transparent plate spaced from the substrate and through a cavity(fig 9, 2) defined between the transparent plate and the substrate', and directing the light through a liquid having an index of refraction greater than one disposed within the cavity(fig 15), including passing the light through and refracting the light at an interface of the liquid(the light will inherently refract at the interface of the substrate and the liquid since as shown by fig 15, the liquid and the substrate have different index of refraction), wherein the interface of the liquid is oriented at an angle to a surface of the at least one electrode and oriented at an angle to a surface of the transparent plate(fig 9, col 4, lines 32-68).

Regarding claim 41, Sakata discloses the surface of the at least one electrode is substantially planar over an entirety thereof(fig 9, 4).

Regarding claim 42, Sakata discloses the surface of the at least one electrode is oriented substantially parallel with the surface of the transparent plate(fig 9, 4).

Regarding claim 43, Sakata discloses the index of refraction of the liquid is adapted to change when an electrical signal is applied to the at least one electrode(col 16, lines 29-40).

Regarding claim 44, Sakata discloses wherein directing the light through the transparent plate includes directing the light toward an uneven surface of the transparent plate including a plurality of recessed areas, wherein the interface of the liquid is provided along the uneven surface within the recessed areas (fig 9, 2, 3).

Regarding claim 45, Sakata discloses the at least one electrode is associated with one of the recessed areas of the uneven surface(fig 9, 2, 3).

Regarding claim 46, Sakata discloses wherein directing the light through the transparent plate includes directing the light through a transparent electrode formed within the transparent plate(fig 9, 3, 4).

Regarding claim 50, Sakata discloses forming the at least one electrode includes forming the surface of the at least one electrode as a reflective surface, wherein the reflective surface is adapted to reflect the light through the liquid, through the interface of the liquid, and through the surface of the transparent plate(col 12, lines 25-40).

Regarding claim 51, Sakata discloses the substrate is a transparent substrate, and wherein forming the at least one electrode includes forming the at least one electrode as a transparent electrode, wherein the light is adapted to pass through the transparent electrode and the transparent substrate(fig 9).

Allowable Subject Matter

Claims 8-11, 23-26, 36, 37, 47-49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. With the allowable features being; a sidewall extended between the substrate and the transparent plate, and an additional electrode formed on the sidewall adjacent the cavity(claim 8, 36); applying an electrical signal to an additional electrode of the light modulator, including moving the liquid toward the additional electrode(claim 47).

Conclusion

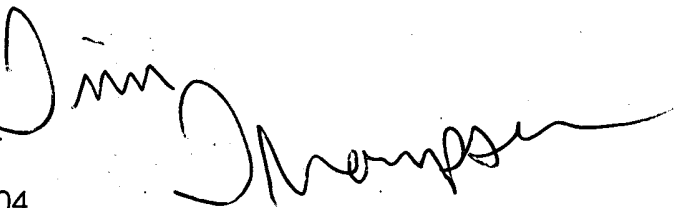
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Drzaic et al.(U.S. Patent No. 5,156,452), Fergason et al.(U.S. Patent Pub. No. 5,486,940) and Kondoh et al.(U.S. Patent No. 2003/0016905) are pertinent to light modulators with uneven surfaces having the interface of the liquid at an angle to the surface of at least one electrode.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J. Thompson whose telephone number is (703) 305-0881. If the examiner can not be reached his supervisor, Georgia Epps, can be reached on (703) 308-4883.

T.J.T.

5/20/04

A handwritten signature in black ink, appearing to read "Tim Thompson", written over the typed name and date.